

11 APR 2019

PAPER CODE : 21505

B. Sc Semester- V Examination,
STAT -CC- 505 [Some Probability Distribution Models]

TIME: $2\frac{1}{2}$ Hours

Marks: 70

- INSTRUCTIONS:** 1) There are 5 compulsory questions in this question paper.
2) Use of Scientific calculator is allowed.
3) Statistical tables and graph paper will be provided on request.

- Q1 a) What do you mean by truncated distribution? State different types of truncated distribution. 7
b) Obtain mean and variance of left truncated binomial distribution . 7
OR
Q1 a) Obtain the probability mass function of a truncated binomial probability distribution which is truncated at the highest value. 7
b) Obtain mean and variance of right truncated binomial distribution . 7
Q2 a) Define the truncated Poisson probability distribution truncated at $X = 0$. Further find its r^{th} order factorial moment $\mu'_{[r]}$. Hence find its standard deviation. 9
b) Define left truncated Poisson distribution truncated . Obtain mean and variance of left truncated Poisson distribution truncated at $X = 0$. 5
OR
Q2 a) Obtain the probability density function of a normal probability distribution which is truncated to the left of a real number $X=C$. 7
b) Find the mean of truncated normal probability distribution which is truncated to the left of its mean μ . 7
Q3 a) Define a chi- square random variable with n- degrees of freedom. Derive its p. d. f. 6
b) Show that – 8
i) Chi-square distribution with 2 d. f. is exponential with $\theta = 2$.
ii) Chi-square distribution with $\frac{n}{2}$ d. f. is a Gamma with $(\alpha = \frac{1}{2}, \lambda = \frac{n}{2})$.
OR
Q3 a) Find M.G.F. and C.G.F. of χ^2 distribution 8
b) If the MGF of a r.v. X is 6
$$M_x(t) = (1 - 2t)^{-12}, t < \frac{1}{2}$$

Find – (1) E(X), (2) V(X) and (3) P[5.66 < X < 42.98].

- Q4 a) For Fisher's t- variable. Show that the student's t statistic follows t- distribution with (n-1) d. f., if x_1, x_2, \dots, x_n is a r. s. from $N(\mu, \sigma^2)$. 6
- b) Find the expression of μ'_{2r} of a t- distribution with n d.f. 8

OR

- Q4 a) Derive the p.d.f. of t distribution with n d.f. and from that derive standard Cauchy distribution. 9
- b) Write properties of t-distribution. 5

- Q5 a) Drive the p. d. f. of F distribution with (n_1, n_2) d. f. 9
- b) Define F variate and derive its p. d. f. If F is F - variate with (n_1, n_2) d. f. then show That $\frac{1}{X}$ is F - variate with ($n_2; n_1$) d. f. 5

OR

- Q5 a) Find the r^{th} order row moment of F distribution with (n_1, n_2) d.f. 8
- b) Let X_1, X_2 be a r. s. from a prob. dist. having p. d. f. 6

$$f(x) = e^{-x}, \quad 0 < X < \infty$$

$$= 0, \quad \text{elsewhere}$$

Show that $Y = \frac{X_1}{X_2}$ follow F – distribution.